

STEREO MOC Status Report
Time Period: 2014:356 - 2014:362

STEREO Ahead (STA) Status:

1. The following Ground System anomalies/events occurred during this reporting period:
 - On day 358, during the DSS-63 support, no commanding was conducted due to the transmitter being declared red because of a faulty switch. This anomaly resulted in the loss of 2.3 hours of commanding and two-way tracking data. See DR #M108477 for more information.
 - On day 359, during the DSS-63 support, initial telemetry lock was 2.4 hours late due to the ground station antenna not being able to move. After the mechanical issue was resolved at 1100z, the remainder of the track was downlink only since the transmitter was still red. These anomalies resulted in the loss of 2.4 hours of real-time telemetry and 6.7 hours of commanding and two-way tracking data. See DR #M108481 for more information.
 - On day 359, during the DSS-43 support, turbo decoder lock was lost briefly at 2149z. This anomaly resulted in the loss of 6 frames of real-time telemetry data.
 - On day 362, during the DSS-63 support, turbo decoder lock was lost intermittently between 0904z and 0913z. This anomaly resulted in the loss of 13 frames of real-time telemetry data.
 - On day 362, during the DSS-43 support, no monitor data was received in the MOC for the duration of the support. When the problem persisted into the day 363 DSS-63 support, GSFC was contacted. The issue was resolved by warm-booting the MUG at GSFC.
2. The following spacecraft/instrument events occurred during this week. Note that the Ahead observatory is operating on the first side lobe of the HGA to prevent overheating of the HGA feed assembly which is currently at 119 degrees C with the HGA angle at 7.1 degrees, with respect to the spacecraft-Sun line.

- The average daily science data return for Ahead, while operating on the first side lobe on the HGA, was 112 Mbits during this week.

STEREO Behind (STB) Status:

1. The following Ground System anomalies/events occurred during this reporting period:

- On day 356, during the DSS-43 support, the uplink sweep and subsequent commanding was started 10 minutes late due to workstation anomaly at the station. See DR #C110821 for more information.
- On day 359, during the DSS-43 support, the command uplink was lost at 0418z due to the transmitter tripping from an overcurrent condition. The transmitter was recalibrated, an uplink sweep was performed, and commanding was restored at 0433z. This anomaly resulted in the loss of 14 minutes of commanding. See DR #C110825 for more information.

2. Detailed status of the activities that occurred on the Behind loss of communication anomaly, which occurred on day 2014-274, are listed below. To ensure communications on the LGA during long term recovery efforts, the Behind track coverage have been reduced to 3 hour 70 meter supports for 3 days in a row each week.

- On day 2014-351, during the DSS-43 support, the DSN begin aberration corrections to optimize the uplink margin during the uplink sweep and blind commanding for the first hour of each support.
- On days 356 through 358, during the DSN 70 meter supports, recovery commanding was conducted to ensure that the transmitter is in its operational configuration. No signal was received by the DSN radio science receivers.

Significant findings to date:

1. Analysis of the three DSN extracted telemetry frames from the carrier signal just before the planned observatory reset/anomaly occurred on day 274, October 1st, showed nominal performance of the spacecraft, i.e., no anomalies,

IMU off, and the star tracker providing an attitude solution.

2. Post reset, from the very limited telemetry, three packets, extracted from the carrier signal by the DSN, the X-axis gyro on IMU-A had failed. Unfortunately, this telemetry contained only G&C anomaly data and no spacecraft summary data, i.e., the state of the RF, G&C, fault protection and other subsystems is not known at the time of the anomaly. With a failed IMU and the star tracker being off-line for an undetermined duration, the sun sensors will keep the observatory pointed at the Sun, though the G&C will not have any roll knowledge, and cannot roll the observatory as part of the safing configuration to re-establish communications on the LGAs. From analysis of this telemetry and initial G&C simulations, it is highly suspected that the observatory is rotating about the principal axis of inertia due to an autonomous momentum dump initiated by bad gyro data flagged good, but this has not yet been confirmed.
3. At least two anomalies occurred post reset, the star tracker not promoting to AAD mode and the X-axis gyro failure. Unfortunately, due to the number of possible combinations, the STEREO fault protection system is not designed for simultaneous failures.

The cause and effect analysis of the loss of communications from the LGAs is continuing. G&C simulations using the bad gyro data flagged good are continuing to better understand the potential impact to the observatory state. Recovery from a negative power state is also being investigated. While the recovery and analysis efforts continue on Behind, as the Ahead observatory will enter superior solar conjunction in March, the primary focus of the engineering team is on developing operational configuration changes to add robustness to the G&C rate sensor usage to ensure the Ahead observatory's continued safety.

Once communications are restored and the anomaly resolved, the operational plan for exiting the solar conjunction testing will continue to return the Behind observatory back to nominal science data collection as soon as safely possible.